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Review of pouched amphistomes of Vietnamese ruminants, with a description of Carmyerius bulbosus sp. n. (Trematoda, Amphistomida)

By

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ABSTRACT. Examination of the pouched amphistomes of Vietnamese domesticated and wild ruminants revealed the presence of seven species: Carmyerius bulbosus sp. n., C. spatiosus (Brandes, 1898), C. synethes (Fischoeder, 1901), Gastrothylax crumenifer (Creplin, 1847), Fischoederius elongatus (Poirier, 1883), F. cobboldi (Poirier, 1883) and F. japonicus Fukui, 1922.

In the literature there are numerous reports on the occurrence of pouched amphistomes in Viet Nam (RAILLIET and GOMY, 1896; RAILLIET, 1924; HOUDEMER, 1938; DROZDZ and MALCZEWSKI, 1967; PHAN THE VIET et al. 1977; SEY, 1980, 1983). These papers reported recovery of the following species: Gastrothylax crumenifer (Creplin, 1847); G. glandiformis Yamaguti, 1939; Carmyerius minutus Fischoeder, 1901; C. spatiosus (Brandes, 1898); Fischoederius elongatus (Poirier, 1883); F. cobboldi (Poirier, 1883); F. japonicus Fukui, 1922. These examinations, based on gross-morphological observations, were without any information on the structure of the muscular organs whereas it has generally been accepted that in the modern diagnosis of amphistomes the knowledge of the structure of these organs is indispensable. Our examinations, including histomorphological traits also, confirmed, on the one hand, the occurrence of the major part of the previously described species, and, on the other hand they represent further new information on the gastrothylacids of the country in question.

MATERIAL AND METHODS

Test materials were deposited at the Department of Parasitology, Vietnamese Scientific Research Center, Hanoi and collected from the following ruminants: Bos primigenius f. taurus, Bubalus arnee f. bubalis, Capra aegargus f. hircus, Cervus unicolor and Muntiacus muntjak. Flukes were stored in 70% alcohol and altogether nineteen vials were available for examination. Median sagittal sections were prepared by the usual methods and the appearance of the ventral pouch was studied on cross section made at the middle part of body. Measurements are provided in mm unless indicated otherwise.

RESULTS AND DISCUSSION

Some histomorphological remarks

NÄSMARK (1937), describing the structure of pharynx of amphistomes, designated the Paramphistomum-type for all representatives of gastrothylacids, which are characterized by having no middle circular layer. Later DINNIK (1964) and REINHARDT (1969) pointed out that this type has middle circular layer which is easily seen on cross section. Due to the

resemblance of Paramphistomum and Calicophoron types of pharynxes DINNIK (1964) suggested to combine these types under the name Calicophoron because the type species of the genus Paramphistomum has a different type of pharynx (Liorchis). In respect of the structure of the pharynx of gastrothylacids NÄSMARK (1937) was, however, right because the middle circular layer in gastrothylacids was lacking even if they were seen on cross sections. Therefore the Paramphistomum-type of pharynx should be preserved in this context, and it is not justified to designated another type of pharynx (Gastrothylax) as recommended earlier by the present writer (SEY, 1983).

Examining the structure of genital opening of Fischoederius japonicus on sagittal sections, it was found that median and genital papillae were detected with sphincter papillae and genital sphincter. The median papilla and the wall of the ventral atrium are covered by minute tegumental papillae. Such a structure of genital opening is not yet known among amphistomes, therefore the writer regards it to be a new one and the name, Microbothriopapillatus is proposed.

Gastrothylacids recovered

Carmyerius bulbosus sp.n. (Figs 1-9)

Description. Specimens more or less conical or subelliptical, 6.5-7.2 in length and 2.5-2.8 in greatest width, 2.8-3.1 in dorso-ventral direction (Figs 1-2). Pharynx terminal, measuring 0.5-0.7 by 0.6-0.7 (Figs 3-4). Oesophagus 0.38-0.45 in length with muscular thickening along its posterior half (Figs 3, 5); breadth of musculature about 45 um. Caeca in lateral region, extending posteriorly, forming moderately sharp and irregular dorso-ventral coils and their ends terminate at middle part of testes. Ventral pouch voluminous, quadrangual in cross section, with apex dorsally. Acetabulum terminal, 1.2-1.5 in diameter, Gastrothylax-type with muscular units: d.e: 56-60, d.i: 43-45, v.e: 58-62, v.i: 47-49 (Figs 6-7). Testes symmetrical, lateral to acetabulum, slightly lobed, near to each other. Right testis measuring 0.91-1.2 by 0.7-0.75; left one 0.85-1.1 by 0.81-0.95. Pars musculosa well developed, forming several convolutions along its length, extension cover about 0.9-1.1. Pars prostatica with strongly developed prostatic cells, slightly coiled (4-5 bends), about four to five times as long as its width. Laurer's canal runs parallel and anteriorly to excretory canal, opening at dorsal surface about 0.35-0.39 anteriorly to excretory pore (Fig. 8). Uterus median in its entire course formes several loose coils containing numerous eggs. Eggs in utero measure 0.11-0.12 by 0.50. Genital opening lies ventrally inside ventral pouch at a level of oesophageal bifurcation (Figs 3, 9). Circular musculature absent, radial muscle elements of genital atrium moderately developed, Gracile-type. Ovary subsphaerical, lies between testes and measuring 0.51-0.60 by 0.29-0.32. Ootypecomplex between testes, measuring 0.35-0.50 by 0.20-0-35. Vitellaria extend laterally from level of pharynx to middle part of testes. Excretory vesicle lies before acetabulum, its canal relatively short and opens on dorsal surface posterior to Laurer's canal, about 1.0-1.2 distance from body end.

Discussion. The new species belongs to the family Gastrothylacidae Stiles et Goldberger, 1910 and allocated to the genus Carmyerius Stiles et Goldberger, 1910 because of the presence of the ventral pouch and the laterally located testes as well as the median course of the uterus. The genus Carmyerius, according to the recent revision (SEY, 1983) includes fifteen valid species. They were divided into two species-groups on the grounds of the presence or absence of papillae along the elements of the genital opening.

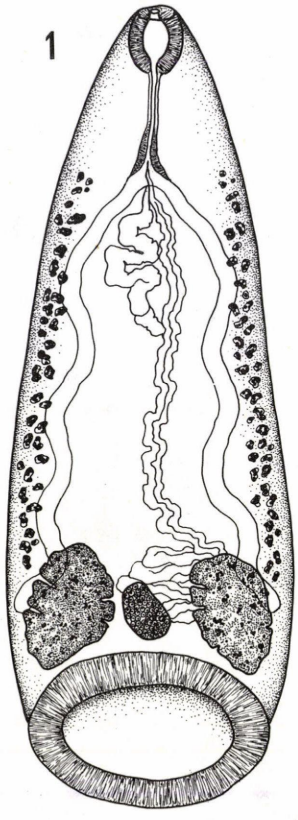
The present new species differs from all the other species assigned to the genus in its having a muscular thickening along the posterior half of the oesophagus. It shows the closest similarity to Carmyerius spatiosus but differs from it in structure of oesophagus, length of caeca and form of ventral pouch. The writer believes that these differences are sufficient to justify the erection of a new species and on the ground of the structure of the oesophagus, the specific name bulbosus is proposed.

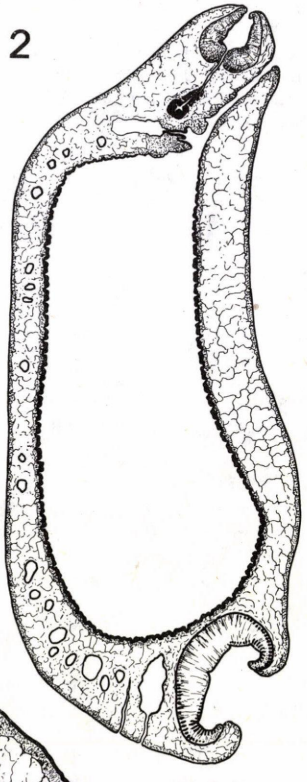
Host: Cervus unicolor

Habitat: rumen

Locality: Lang son (Viet Nam)

Type specimens: Department of Zoology, Janus Pannonius University, Pécs, Hungary, (No. 1623, three specimens).





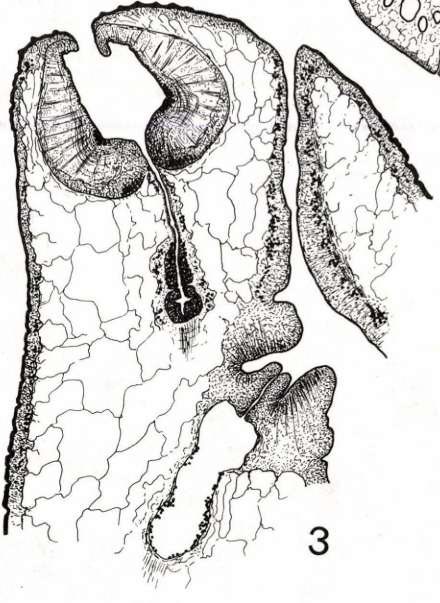


Fig. 1. Carmyerius bulbosus sp. n., ventral view
Fig. 2. Carmyerius bulbosus sp. n., median sagittal section
Fig. 3. Carmyerius bulbosus sp. n., anterior part of body (median sagittal section)

Gastrothylax crumenifer (Creplin, 1847)

This species is one of the commonest pouched worms, it was found in cattle, buffalo and goat. Of the nineteen samples ten contained this helminth. It has Paramphistomum-type of pharynx and acetabulum and Gracile-type of genital opening. Ventral pouch is triangular with dorsally directed apex.

Carmyerius spatiosus (Brandes, 1898)

It was recovered in cattle, buffalo and Muntiacus muntjak. In the said hosts numerous specimens were found. Pharynx and acetabulum are Gastrothylax-type, genital opening is a Gracile-type. Ventral pouch is triangular with blunt angles.

Carmyerius synethes (Fischoeder, 1901)

This species was found for the first time in Viet Nam, although in the neighbouring countries (Malaysia, DAWES, 1936; SCHAD et al. 1964; Philippines, EDUARDO, 1975) it was reported by several authors. It was recovered in cattle, buffalo and Cervus unicolor. The latter is a new host record. C. synethes is characterized by having Paramphistomum-type of pharynx, Synethes-type of genital opening and Gastrothylax-type of acetabulum. Ventral pouch triangular with apex ventrally directed.

Fischoederius elongatus (Poirier, 1883)

On the grounds of the test material available it seems to be the commonest species in Viet Nam, twelve of the nineteen vials contained it, parasitizing in all of the examined hosts. It has Paramphistomum-type of pharynx, Elongatus-type of genital opening and Fischoederius-type of acetabulum. Ventral pouch is triangular with apex ventrally directed.

Fischoederius cobboldi (Poirier, 1883)

It seems to be a rare amphistome in Viet Nam, it was found only one sample in a small number. It has Paramphistomum-type of pharynx, Microbothrium-type of genital opening and Gastrothylax-type of acetabulum. Ventral pouch triangular with apex directed ventrally.

Fischoederius japonicus Fukui, 1922 (Figs 10-12)

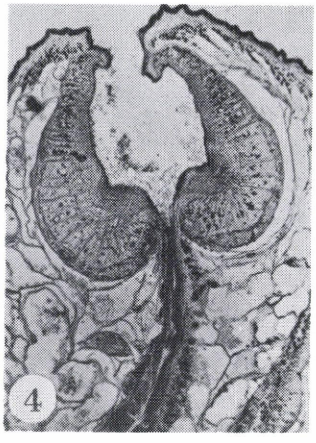
This species described for the first time by FUKUI (1922, 1929) as subspecies, Fischoederius siamensis var. japonicus and Gastrothylax elongatus var. japonicus respectively. YAMAGUTI (1935) considered it to be a synonym of F. elongatus but later (YAMAGUTI, 1939) elevated it to full specific rank, naming it F. japonicus Fukui, 1922. SEY (1983), on the basis of literary data, sank it to synonym of F. elongatus.

In samples of Vietnamese pouched amphistomes there were numerous specimens, collected from cattle, buffalo and Cervus unicolor. The latter is a new host record. Although F. elongatus and F. japonicus show close similarity to each other but clearly cut differences can be observed both in their gross-morphology and in structure of their muscular organs. Shape of body of F. japonicus is not so slender as that of F. elongatus but rather plump, caeca extending to testicular zone, testes situated in the pre-acetabular median region, anterior dorsally, posterior ventrally, with their zones and fields coinciding or overlapping for the most part. In structure of muscular organs F. japonicus differs from F. elongatus by having Microbothriopapillatus-type of genital opening (Fig. 10) and Carmyerius-type of acetabulum (Figs 11-12); the same organs in F. elongatus are Elongatus-type and Fischoederius-type respectively. These differences justify convincingly the validity of F. japonicus.

Legend to figures:

Figs 4-9. Median sagittal section of Carmyerius bulbosus sp. n.; 4= pharynx and oesophagus; 5= oesophageal thickening; 6-7= dorsal and ventral halves of acetabulum; 8= position of excretory and Laurer's canals; 9= genital opening

Figs 10-12. Median sagittal sections of Fischoederius japonicus; 10= genital opening; 11-12= dorsal and ventral halves of acetabulum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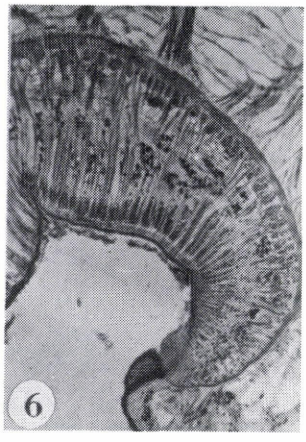
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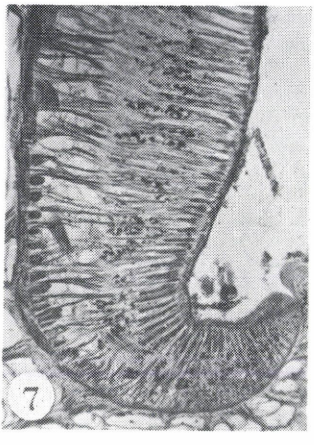
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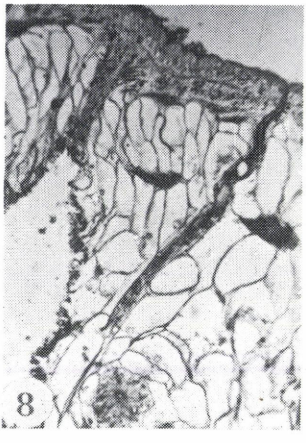
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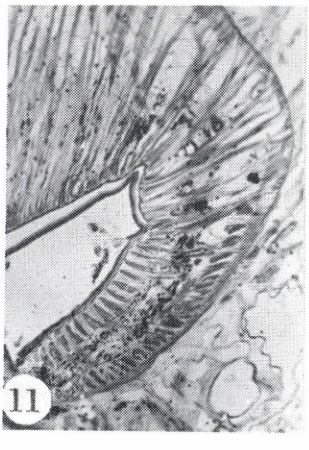
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Out of the previously described pouched amphistomes from Viet Nam, Carmyerius minutus (Fischoeder, 1901) and Gastrothylax glandiformis Yamaguti, 1939 were not recovered in samples available for examination. DROZDZ and MALCZEWSKI (1967), who pointed out these species in Viet Nam for the first time, did not present a solid basis for assumption their occurrence in this country.

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